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EVALUATION OF DEFOLIATION ON MAMMOTH CAVE NATIONAL PARK, KENTUCKY - 1980

by

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INTRODUCTION

An aerial survey of Mammoth Cave National Park on May 30, 1980 detected scattered light defoliation over much of the Park's 51,311 acres (Carothers, 1980). A ground inspection indicated that defoliation was caused by a complex of geometrids, including linden looper (Erannis tiliaria), spring cankerworm (Paleacrita vernata), and the half-wing geometer (Phigalia titea).

All are native forest defoliators which exhibit cyclic periodic outbreaks which last from 2 to 4 years. Their native range is from southern Canada to northern Georgia, southwest to east Texas, and west to the Great Plains. Apples and elms are the preferred hosts, but a variety of other deciduous trees are also attacked. These include both the white and red oak groups, hickories, basswood, and maples. On the Park feeding was predominately on members of the oak groups.

BIOLOGY

The linden looper emerges in the fall following a hard freeze. The wingless female climbs a nearby tree and lays her eggs in bark crevices. Eggs hatch in the spring about the time of foliage emergence. Full grown larvae are about 37 mm long, bright yellow, have rusty brown heads, and 10 wavy black lines running down their backs. Mature larvae drop to the ground and pupate in the soil before summer begins.

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The spring cankerworm emerges in the spring when the ground begins to warm. The wingless females climb a nearby tree, mate and lay groups of eggs in bark crevices. Eggs hatch and larval feeding coincides with leaf emergence. When full grown, larvae are reddish to yellowish-brown, yellowish green, or black and are about 18 to 30 mm long. The head is light and mottled with brown. The body is usually marked with a yellow stripe just below the spiracles, and a broad greenish-yellow strip down the middle of the venter. Mature larvae drop to the ground and construct prepupal chambers in the soil where they overwinter. Pupation occurs in the early spring.

The half-wing geometer overwinters as a pupa, the adults emerge in April and quickly mate. Female are partially winged and cannot fly and must climb a nearby tree to lay eggs. Eggs are deposited in unobvious sites on the bark. After 2 or 3 weeks, the eggs hatch and young larvae begin to skeletonize leaves. Later they consume entire leaves except for the major veins. Mature larvae are about 30 mm long, gray to brown, with numerous black lines running the length of the body, yellow patches on the sides, and many sparse hairs and small black projections on the body segments. Pupation takes place in the soil litter with all these defoliators there is only one generation per year.

METHODS

On May 30, 1980 an aerial survey and ground check of the Park was conducted to determine the severity and causal agent(s) of reported defoliation.

RESULTS

The aerial survey detected only light defoliation scattered over the survey area. Where present defoliation was confined to small groups or single trees, primarily members of the oak groups.

A ground inspection indicated that spring cankerworm and linden looper, as reported in 1979 (Ghent and Dull), as well as the half-winged geometer were the causal agents.

Defoliation was well below that experienced last spring. An increase in parasites, as evident by the numerous larvae showing signs of parasitism, and increased numbers of larvae predators aided in the reduction of this season's defoliation. Both Carabidae (ground beetles) and Asopinae (stink bugs) were abundant.

RECOMMENDATIONS

It is evident that natural controlling factors are in sufficient number to reduce the populations of causal agents and the resulting defoliation to acceptable levels. Therefore no chemical control measures need to be instituted next year. In all likelihood only light defoliation, if at all, will be found next spring.

REFERENCES

Carothers, W. A., 1980. Report # 80-3-20, 2 p.

Ghent, J. H., and C. W. Dull. 1979. Evaluation of the linden looper and spring cankerworm outbreak on Mammoth Cave National Park, Kentucky, 1979. 6 p.